ACKNOWLEDGEMENTS

I would like to express my great indebtedness to my revered supervisor, Professor Dr. M. K. Verma, Department of Civil Engineering, National Institute of Technology (NIT) Raipur, (formerly Government Engineering College) Raipur, Chhattisgarh for his invaluable guidance and constant encouragement throughout the course of study. It has been an excellent learning experience to work under his supervision.

It is my great pleasure in expressing my deep sense of respect and indebtedness to my Co-supervisor Dr. M. P. Tripathi, Associate Professor, Department of Soil and Water Engineering, Faculty of Agricultural Engineering, Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur, Chhattisgarh, for his valuable, talented, inspiring, constructive criticism and ceaseless encouragement provided during the entire project work.

I wish to express my sincere thanks to Director Dr. D. S. Bal, Prof. M. M. Hambarde and Dr. S. S. Gokhle for providing essential Institutional facilities during my research work. I am very much thankful to Prof. S. K. Kharia, Prof. & Head, Civil Engg., Dr. R. K. Tripathi, Reader, Civil Engg. and all other faculty members of the department for extending their help and cooperation whenever needed.

I sincerely thank to all the staff members of Department of Soil and Water Engineering, IGKV, Raipur. I am especially thankful to Dr. V. K. Pandey, Er. P. K. Katre and Abhishek Dhumne for their time-to-time co-operation during the course of study.

I express my sincere thanks to all my friends including Mr. Dixit, Pandey, Dudhare, Agrawal, Satpute, Tomar, Tamrakar, Shrivastava, Dwivedi, Ahmad, Bhujrang, Gunesh, Nitin and Sweta for their timely help and moral support during my project work.

Last but not the least, words runs short to express my heartfelt gratitude to my beloved parents for their love, blessings, encouragements and pain taking for me for successful completion of this achievement. It is very difficult for me to express my feelings and gratitude for their love, patience, cooperation and constant inspiration by my brother Dr. Shailendra, bhabhi Sweta, nephew Dinki, Rinki, my wife Swati and daughter Sonal.

Above all, my humble and whole hearted prostration to the God almighty for his blessing and grace.

Date: 15
Place: Raipur

Date: 15th April, 2007

Place: Raipur